

WHAT IS CLAIMED IS:

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2 1. A method of preparing a nucleic acid array on a support, said
3 method comprising synthesizing a plurality of nucleic acids on said support wherein the
4 synthesis steps are carried out in a non-oxidizing atmosphere.

1 2. A method in accordance with claim 1, wherein each nucleic acid
2 occupies a separate predefined region of the support, said synthesizing comprising:
3 (a) activating a region of the support;
4 (b) attaching a nucleotide to a first region, said nucleotide having a
5 masked reactive site linked to a protecting group;
6 (c) repeating steps (a) and (b) on other regions of said support whereby
7 each of said other regions has bound thereto another nucleotide comprising a masked
8 reactive site link to a protecting group, wherein said another nucleotide may be the same
9 or different from that used in step (b);
10 (d) removing the protecting group from one of the nucleotides bound to
11 one of the regions of the support to provide a region bearing a nucleotide having an
12 unmasked reactive site;
13 (e) binding an additional nucleotide to the nucleotide with an unmasked
14 reactive site;
15 (f) repeating steps (d) and (e) on regions of the support until a desired
16 plurality of nucleic acids is synthesized, each nucleic acid occupying separate predefined
17 regions of the support;
18 wherein each of steps (a) through (f) are carried out in a non-oxidizing
19 atmosphere.

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2 3. A method in accordance with claim 1, wherein said synthesizing
3 comprises the sequential steps of:
4 a) generating a pattern of light and dark areas by selectively irradiating at
5 least a first area of a surface of a substrate, said surface comprising immobilized
6 nucleotides on said surface, said nucleotides capped with a photoremovable protective
7 group, without irradiating at least a second area of said surface, to remove said protective
8 group from said nucleotides in said first area;
9 b) simultaneously contacting said first area and said second area of said
10 surface with a first nucleotide to couple said first nucleotide to said immobilized

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A1 claim 10

11 nucleotides in said first area, and not in said second area, said first nucleotide capped with
12 said photoremovable protective group;

13 c) generating another pattern of light and dark areas by selectively
14 irradiating with light at least a part of said first area of said surface and at least a part of
15 said second area to remove said protective group in said at least a part of said first area
16 and said at least a part of said second area;

17 d) simultaneously contacting said first area and said second area of said
18 surface with a second nucleotide to couple said second nucleotide to said immobilized
19 nucleotides in at least a part of said first area and at least a part of said second area;

20 e) performing additional irradiating and nucleotide contacting and
21 coupling steps so that a matrix array of at least 100 nucleic acids having different
22 sequences is formed on said support;

23 with the proviso that steps (a) through (e) are performed in said non-oxidizing
24 atmosphere, and said atmosphere has an ozone concentration of from about 0 to about 5
ppb.

1 4. A method in accordance with claim 3, wherein said atmosphere is
2 carbon-filtered air.

1 5. A method in accordance with claim 3, wherein said atmosphere is
2 an inert gas.

1 6. A method in accordance with claim 3, wherein said atmosphere is
2 argon.

1 5K3
2 A3 7. A method in accordance with claim 3, wherein said substrate is
3 irradiated with light directed from a source at a position opposite the surface comprising
said immobilized nucleotides.

1 8. A method in accordance with claim 3, wherein said substrate is
2 irradiated with light directed from a source on the same side of the surface comprising
3 said immobilized nucleotides.

1 9. A method in accordance with claim 3, wherein said substrate is
2 irradiated with light from a position opposite the surface comprising said immobilized
3 nucleotides and said atmosphere is an inert gas atmosphere.

1 10. A method of preparing and packaging a nucleic acid array, said
2 method comprising,

3 (a) preparing a nucleic acid array according to the method of claim 1; and

4 (b) packaging said nucleic acid array in an enclosure having a non-
5 oxidizing atmosphere.

1 11. A method in accordance with claim 10, wherein each of said steps
2 is conducted in a facility having an atmosphere comprising 5 ppb or less ozone.

1 12. A method in accordance with claim 10, wherein for the period of
2 time between said preparing and packaging steps, said nucleic acid array is exposed to
3 unfiltered air for a period of 2 hours or less.

1 13. A method of preparing a nucleic acid array, said method
2 comprising attaching each of a plurality of nucleic acids to a solid support at preselected
3 locations to provide said array, wherein said attaching is carried out in a non-oxidizing
4 atmosphere.

1 14. A method in accordance with claim 13, said atmosphere
2 comprising ozone at a concentration of from about 0 to 5 ppb.

1 15. A method in accordance with claim 2, wherein each of said nucleic
2 acids comprise from 5 to 30 nucleotide residues.

1 16. A nucleic acid array prepared by the method of claim 1.

1 17. A nucleic acid array prepared and packaged by the method of claim
2 10.

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